

CLAIMS

What is claimed is:

1. A method comprising:  
multiplying [A] by [x] to obtain [y];  
wherein said [x] is a matrix of inputs, said [y] is a matrix of outputs, and  
said [A] is a matrix of predetermined values and multiplication operations;  
and  
wherein said multiplication operations within said [A] are paired.
2. The method as in claim 1,  
wherein said matrix [A] is factored into a butterfly matrix [B], a shuffle  
matrix [S], and a multiplication matrix [M]; and  
wherein multiplication operations within said multiplication matrix  
[M] are grouped for simultaneous execution.
3. The method as in claim 1, wherein at least one n-point discrete cosine  
transform (DCT) is performed.
4. The method as in claim 3, wherein multimedia compression is  
performed.
5. The method as in claim 3, wherein at least one shape adaptive discrete  
cosine transform (SA-DCT) is performed.
6. The method as in claim 1, wherein at least one n-point inverse discrete  
cosine transform (IDCT) is performed.
7. The method as in claim 6, wherein multimedia decompression is  
performed.
8. The method as in claim 6, wherein at least one SA-IDCT is performed.
9. The method as in claim 1, implemented using single instruction  
multiple data (SIMD) operations.

10. The method as in claim 10, implemented using MMX operations.

11. The method as in claim 10, implemented using PMADDWD instructions.

12. The method as in claim 1, implemented using at least one of very large scale integration (VLSI) implementation, single processor implementation, vector processing.

13. A machine readable storage medium having executable instructions which, when executed by a machine, cause said machine to perform operations comprising:

multiplying [A] by [x] to obtain [y];

wherein said [x] is a matrix of inputs, said [y] is a matrix of outputs, and said [A] is a matrix of predetermined values and multiplication operations; and

wherein said multiplication operations within said [A] are paired.

14. The machine readable storage medium as in claim 13, wherein said matrix [A] is factored into butterfly matrix [B], shuffle matrix [S], and multiplication matrix [M]; and

wherein multiplication operations within said multiplication matrix [M] are grouped for simultaneous execution.

15. The machine readable storage medium as in claim 13, wherein at least one n-point DCT is performed.

16. The machine readable storage medium as in claim 15, wherein multimedia compression is performed.

17. The machine readable storage medium as in claim 15, wherein at least one SA-DCT is performed.

18. The machine readable storage medium as in claim 13, wherein at least one n-point IDCT is performed.

19. The machine readable storage medium as in claim 18, wherein multimedia decompression is performed.

20. The machine readable storage medium as in claim 18, wherein at least one SA-IDCT is performed.

21. The machine readable storage medium as in claim 13, implemented using SIMD operations.

22. The machine readable storage medium as in claim 21, implemented using MMX operations.

23. The machine readable storage medium as in claim 22, implemented using PMADDWD instructions.

24. The machine readable storage medium as in claim 13, implemented using at least one VLSI implementation, single processor implementation, vector processing.

25. A method comprising performing an n-point DCT or an n-point IDCT wherein multiplication operations and addition operations within said n-point DCT and said n-point IDCT are paired.

26. The method as in claim 25, further comprising performing SA-DCT or SA-IDCT.

27. The method as in claim 25, implemented using instructions that can execute multiple operations in parallel.

28. The method as in claim 27, said instructions being at least one of MMX™ operations and Streaming SIMD Extensions.